

ANNALS
OF THE
Association of
American Geographers

VOLUME XVI, 1926



ALMON ERNEST PARKINS, *Editor*

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Annals of the Association of American Geographers

Subscription \$3.00 per volume unbound; \$3.50 in bound form.

Communications should be addressed to
ASSOCIATION OF AMERICAN GEOGRAPHERS,
George Peabody College for Teachers,
Nashville, Tennessee

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ANNALS
OF THE
Association of American Geographers

VOLUME XVI

MARCH 1926

No. 1

**ADJUSTMENTS TO ENVIRONMENT IN SOUTH AMERICA:
AN INTERPLY OF INFLUENCES*†**

By R. H. WHITBECK

What does the geographer mean when he speaks of the geography of a region as dealing with man's adjustment to the natural environment? The term "adjustment" has replaced "response" because "adjustment" implies that man voluntarily selects and pursues a certain course of action, rather than passively responds to it as a plant might do. Does the geographer imply that human adjustment to natural environment means that the environment determines just what kind of adjustment men must make? By no means. A great many kinds of adjustments are made in the same environment, and many factors wholly outside the local environment and many factors wholly outside the field of geography affect the particular form of adjustment that people make to the natural conditions in any regions. Speaking of this point Professor Barrows in his presidential address of 1922 said. "The habits and aptitudes of the people, markets for their products, prices, transportation facilities and rates, land values, the availability and cost of labor, the competition of other regions, laws and governmental policy—all these and various other factors may help to bring about a particular adjustment to environment."¹

PURPOSE OF THE PAPER.—In this paper I shall lay stress upon influences that arise outside of the natural environment of a region and yet which are so instrumental in guiding human activities that they must be constantly taken into account in treating the geography of the regions. In thus laying the emphasis I am purposely omitting the dis-

¹Annals of the Association of American Geographers, Vol. 13, No. 1, p. 10, Mar., 1923.

*Presidential address at the Madison meeting December 30, 31, 1925 and Jan. 1, 1926.

†What is Geography.—Geographers have not yet reached full agreement regarding the definition of their science. It is a question of perennial debate. Perhaps we place too much stress upon this matter of definition, but a new or rejuvenated subject is likely to have its growing pains. Recently we have come to use the term "human geography," which implies that there are also phases of the science which are not human. These are physical geography, mathematical geography, plant geography, animal geography, mineral geography, and perhaps other phases.

cussion of strictly geographical influences arising immediately out of the regional environment. There is no desire to belittle such fundamental influences as climate, land surface, natural resources, and other strictly geographical factors. My purpose is to show that the factors of the regional environment may be favorable to certain human adjustments and unfavorable to others; yet that the actual development of geographical regions and the ways in which opportunities are utilized depend very much upon historical, political, racial, and other human factors. In short, that, in human geography, the kind of men who do the adjusting to natural environment, is quite as important as the environment and that very different adjustments to environment are made at different periods of history.

CERTAIN GEOGRAPHIC PRINCIPLES APPLIED TO SOUTH AMERICA.—

It is my purpose to elaborate some of these principles as they apply to parts of South America, and to point out as well as I may how complex is the interplay of forces in man's adjustment to environment under modern conditions. Since there are many races, varieties, and gradations of mankind in every stage of social evolution from savagery to high civilization, it follows that the ways in which different people adjust themselves even to the same environment will be exceedingly varied. The geographical environment is a complex association of elements, including climate, surface configuration, relative location, native vegetation, and natural resources. The way in which an individual reacts to his environment is determined partly by the environment and partly by himself; that is, by his own characteristics, and the extent of his own knowledge. When he reacts to his geographical surroundings he does the things he knows how to do and no others.

THE INCAS' ADJUSTMENT TO THE ANDINE ENVIRONMENT.—

For example, the early savage of the Peruvian plateau made his own kind of adjustment to life on that plateau, an adjustment that involved little more than providing for his physical wants. Later, the stone-cutting pre-Incas lived a very different kind of life in the same environment. They developed to marvelous perfection the art of dressing rock and building stone structures of astounding size. The conquering Incas imitated, though they did not equal, the pre-Incas in stone work, but

However, there seems to a growing tendency among American geographers to leave plant geography to the botanists, animal geography to the zoologist, mineral geography to the economic geologists, and some would leave physical geography to the geologists. All but one of these fields are cultivated by these respective groups of scientists more than by geographers. The exception is physical geography, the bridge between geology and human geography. Most American physiographers, as is well known, were trained as geologists, but many of them—perhaps most of them—have affiliated themselves

they developed a social and political system of a surprisingly high order. There can be little doubt that the general level of human well-being among the Indians under the Inca rule was higher than it is now under Caucasian rule. The geographical environment of the Peruvian Andes has been essentially the same during thousands of years, but present human adjustments there are wholly different from those of the past because of the different stages of progress of the peoples involved. The massive rock cliffs and ledges of the Andes supplied the suggestion and the materials for building stone walls. But mountains everywhere do this. In the central Andes certain Indians reacted to their environment by building huge stone structures, terracing the mountain sides on almost impossible slopes, constructing paved roads, and doing other remarkable things. Yet, elsewhere in the Andes the inhabitants did nothing of the sort, and the present descendants of the Incas do nothing of the sort. They appear to be wholly incapable of any such achievement.

The Andes with their rocky slopes, thin soil, and scanty rainfall supplied a particular type of environment which permitted and perhaps suggested stone walls, terraced slopes, and irrigation. In one section of the Andes there lived a people who made these particular adjustments. They are no longer doing so. It is true that the Incas or pre-Incas could not have built their massive stone structures in the Argentine pampa, for example. The environment would scarcely permit it. The environment of the Peruvian plateau permitted it, but in no sense necessitated it. Apparently, something in the Peruvian Indians themselves led them gradually to select the particular and unusual types of adjustment that they made. Somewhat as deVries and his followers found that in the plant world sports appear, displaying marked deviations from type, so certain Indian races in America, including the Incas, seem to have been ethnogenic sports.

The natural environment suggests a great variety of adjustments that men may make, if they choose. The character, culture, and historic background of the men themselves determine which of many possible adjustments they actually will make. The environment is permissive, not mandatory. In essentially the same geographical environment, the earliest Andean savages, the Incas, the conquering Spaniards, the

with the geographers. In fact, this Association was organized by physiographers and in its first years it was strongly physiographic in its interests and leanings. More recently its leanings have been toward human geography and they will probably remain so. In the future development of the science, human geography will be the dominating aspect, mainly because people are more interested in the doings of mankind than they are in the distribution of plants, animals, and minerals, or in the evolution of the surface features of the earth.

present Peruvians, and the English or American residents in Peru all react differently because of differences in their respective racial inheritances, and in the amount and kind of knowledge of which they are possessed.

TIME, PLACE, AND PEOPLE.—Most of the geographical adjustments that men make are directly or indirectly for economic motives. Whereas, in a primitive stage of society men are concerned mainly with getting a living and providing for their protection, as they advance in civilization, their wants multiply and they desire not only sustenance and protection, but they desire wealth. Their wants and their knowledge increase with advancing civilization, and the kinds of economic activities in which men engage change progressively.

The struggle for economic well-being is shaped by three major factors: (1) the opportunities which the environment furnishes, (2) the characteristics of the people themselves, and (3) the stage of culture at which they are living. These three factors may be summarized as geographical, racial, and historical. This triad of interdependent factors—place, people, and period—may be seen in almost every important human achievement; for example, in the building of the Panama Canal. It could be built only in a place geographically favorable, such as the narrow isthmus of Panama. Natural conditions determined where it might be placed. It could be built only by a people of high engineering attainments and large wealth; and it was not built until knowledge of sanitation, the perfecting of machinery, and the pressure of our commercial and military needs impelled us to action. It was a matter of *time* and *people* as well as of *place*.

MAN AND ENVIRONMENT AT CHUQUICAMATA.—In the desert of Atacama in northern Chile is a mountain of copper ore, the famous Chuquicamata deposit, now owned by an American corporation. It is one of the greatest if not actually the greatest of known copper ore bodies. The ore, however, is of low grade. The deposit was worked in turn by the Indians before the Spaniards came, by the Spaniards, and by the Chileans; but during these periods Chuquicamata contributed little copper to the world's supply. The ore body is the outstanding economic element in that region. Today 14,000 people live in the made-to-order

The phase of geography in which people are most interested, however, can not lay claim to being the whole of geography unless geographers as a whole agree so to limit it. This they are not all willing to do. In his presidential address in 1922, Prof. Barrows, defining geography as human ecology, stated that "geographers in increasing numbers define their subject as dealing solely with the mutual relations between man and his natural environment."¹ The proponents of this view of the content of geography,

¹ *Annals of the Association of American Geographers*, Vol. 13, No. 1, p. 3, Mar., 1923.

town that surrounds the plant; 20,000 tons of copper ore are treated daily, and the annual output of over 200 million pounds of refined copper is the largest produced by any single copper camp in the world, and about the lowest in cost.

In connection with this enterprise certain significant facts stand out prominently. There is only one strictly favorable element in the environment of this region, namely, a very large body of ore at the surface of the ground. Opposed to this are many adverse conditions. The region is an absolute desert. Water has to be piped 80 miles from the mountains. There is no food except a little produced under irrigation in a neighboring valley. Practically all food must be brought in. There is no fuel or water power. The 60,000 horsepower needed is generated at the coast, a hundred miles away, and is transmitted by wire to the mines. There is no local labor. All labor and a large staff of experts must be imported and kept satisfied in this isolated desert community. There is no local capital to finance the enterprise. It must be obtained elsewhere. There is no nearby market for copper. It must be shipped thousands of miles to find consuming markets.

It is reported that over a hundred million dollars have been invested in this, the greatest single economic enterprise in all South America. Here man's adjustment takes the form of a conquest of an adverse environment rather than a simple adjustment. But this conquest had to wait centuries after the discovery of the ore body by white men. It had to wait until competent people—metallurgists, chemists, engineers, and capitalists—in another part of the world had accumulated experience, knowledge, and capital, which they saw fit to devote to the exploitation of this Chilean ore body. The geographical environment supplied one favorable and fundamental but wholly passive element—a mining opportunity. But this opportunity came to realization only when the science of electro-metallurgy reached a certain stage of advancement, and the world's demand offered a market for great quantities of copper; for, this ore can be worked cheaply only if worked on a large scale. This is not a case of man's adjustment to his own environment, but the conquest by strangers of an environment thousands of miles away, because of demands for copper in the highly industrialized countries around the North Atlantic.

hold that it is to the advantage of the science deliberately to restrict its field to that of human geography, and not to include the physical or any other non-human phase. In this view many of the older geographers and doubtless some others do not agree. While recognizing the present strong trend toward human geography, the elder statesmen hardly like to be read out of the party which they organized.

If geography be restricted solely to the mutual relations between man and his natural environment, then any descriptive account of the natural features of the earth's surface

THE CHILEAN NITRATE INDUSTRY.—The Chilean nitrate industry, collectively the largest mineral industry of South America, is more than a mere accommodative adjustment to natural environment; it too is a conquest of difficult conditions by men from distant lands or their descendants. Virtually all of the nitrate is sent thousands of miles to find a market. If there were not this demand for nitrate wholly without and beyond the local environment of northern Chile, the nitrate industry would promptly disappear. This hundred-million-dollar industry is a human adjustment in one environment, actuated by a demand for nitrate in a wholly different environment. The entire industry is the outgrowth of world-wide conditions, not simply of local conditions.

SHEEP RAISING IN THE FAR SOUTH.—In the extreme south of Chile and of Argentina, in the bleak and rugged lands of Magellanes and Tierra del Fuego, there has grown up a large and distinctive sheep-raising industry. There is one corporation that has a flock of over a million animals. The raising of sheep in this remote region is an intelligent economic adjustment to a cold and rugged region that can be put to scarcely any other use. But who are the people that are making this intelligent adjustment? The people who belong there, Fuegian and Patagonian Indians? By no means. It is being done by people from other lands, mainly by Britishers, especially Scotchmen, some of whom came from British sheep-raising ancestors in the Falkland Islands. With a knowledge of sheep breeding and sheep tending learned in another part of the world, and with a knowledge of business methods and of world markets acquired elsewhere, these British sheep raisers have seen and seized an opportunity. They have selected particular breeds of sheep developed in Europe, have crossbred mutton producers with the wool producers, and have evolved a type of animal that endures well the rigorous climate, yields a very heavy fleece, and also makes good mutton. Then these people, possessed of capital and knowledge, built meat-freezing plants, established lines of refrigerator ships to connect Punta Arenas with mutton-eating London, secured a market in hog-killing Chicago for a quarter of a million pounds of sausage casings a year, and thus by their energetic and intelligent efforts they have built up a great industry in another of the waste places of the

is not geography. This view would throw out the major part of the material published in geographical magazines and would encounter objection from most of the geographical societies of the world. It is self-evident that, before one can study the mutual relations between man and his natural environment, he must somewhere have learned of what that environment is made up. If the descriptive account of the physical features of a region is not a part of the geography, then the student of geography must learn of it under some other name. Presumably he might learn it under the name of physiography,

earth. In this, as in many other of the economic developments in South America, the geography of the region involves not primarily an adjustment to environment by the people living in the region, but chiefly by foreigners who in other lands have risen to a much higher economic plane than that occupied by the natives of the region.

UTILIZATION OF THE ARGENTINE PAMPA.—The outstanding industry in the Argentina pampa is the raising of beef cattle of breeds perfected in Europe, fed on alfalfa introduced from the Levant, slaughtered mainly in packing houses built by Chicago packers, financed with United States and British capital, exported in British-owned refrigerator ships to consumers in Europe. Of all the contributions to the realization of this the largest beef-exporting industry in the world, the geographical environment of Argentina supplies one, namely, a favorable place in which to do it. This valuable industry developed when a favorable place, people, and time came into conjunction. This adjustment to the pampa environment is made by imported people, who raise imported breeds of cattle fed mainly on an imported forage plant. The cattle are slaughtered in packing houses built with imported capital, directed by imported managers. Only the geographical environment is native; yet, of course, that is a fundamental factor. It provides opportunities,—opportunities to raise cereals, or potatoes, or alfalfa, or sheep, or cattle, or all of these. And man does raise all of these on the pampa; but he devotes more land to alfalfa than to any other crop, and more attention to beef cattle than to any other animals. He does so partly because the local geographical factors of soil, climate, and ground water are especially favorable to alfalfa, which can be turned into excellent beef for a receptive European market. This adjustment is complex, not simple. It is governed not only by the local environment but still more by world-wide influences.

COTTON AND QUEBRACHO IN THE CHACO.—In the Argentine Chaco they are now developing a cotton-growing industry. It is advancing rapidly, for the geographical conditions are mainly favorable. The local geographical conditions have been favorable for thousands of years. The cotton growers are using imported American cotton seed, and the scientific work is directed by imported cotton specialists. The time has

which is sometimes regarded as including climate, hydrography, and plant and animal inhabitants. In that case, he must study two branches of science—Physiography as a preparation for geography, and later, geography itself.

It would seem that the two groups of geographers differ mainly in the use of terms and not in the necessary content of geographical knowledge of any region.

As already mentioned most of the founders of this Association were physiographers, though they chose to call their organization a geographical association. All the weight

come when Argentina wants to manufacture cotton goods for her people. The time and place being favorable, people who understand cotton growing and cotton manufacturing are imported, and the triangle of time, place, and people being completed, the cotton industry progresses.

The important quebracho extract industry of the Argentine and Paraguayan Chaco receives its impetus from the demand for vegetable tannins in the United States and Germany. Without this demand which comes from shortages in distant industrial countries, the quebracho industry of the Chaco would be of little or no consequence. The men who have developed the industry are not the residents of the region. It is an inadequate statement of the case to say that these men and corporations are adjusting themselves to the environment of the Chaco. They do make many adjustments to geographical conditions there, but they also do much more. They overcome adverse elements, they build railways, erect factories, bring in laborers, secure capital, and find markets.

The outstanding economic fact in the geography of the region is the valuable resource of quebracho trees, found nowhere else in the world. But equally important is the demand for the extract in foreign lands. Given these two conditions, man adjusts himself to environment in this region where he must and overcomes it where he needs to: it is purposeful mastery, not submissive acquiescence.

THE COFFEE INDUSTRY OF BRAZIL.—The great coffee industry of Brazil is the best large-scale example of economic utilization of opportunities by the people who occupy a region, that South America furnishes. In this instance, the capital, energy, and brains are largely supplied by residents of Brazil. It is true that the coffee tree is an imported plant, and that the industry depends upon a demand for coffee in foreign lands; yet the industry is, to a remarkable degree, the outgrowth of unique conditions of special soil, special topography, and special climate. The very favorableness of the geographical elements nearly ruined the industry through overproduction. The forces of government had to step in and by control of exports, prevent demoralization of prices and possible bankruptcy of the coffee growers. Control

of past practice, of the historical development of the science, of common usage and common understanding has included physical geography as a part of geography. If, therefore, it were to be excluded, the burden of showing cause rests with those who prefer to restrict the science wholly to human geography, and thus to depart from past practice. I assume that those who would limit geography to human aspects of the science believe that by thus restricting the field, we escape the criticism of pursuing a too-loosely organized and unduly inclusive branch. They would arbitrarily limit the field in order that it may be more intensively cultivated.

by the strong arm of the state seemed necessary to check the too bountiful results of a favorable coffee environment.

SUGAR, COTTON, AND CACAO IN BRAZIL.—At one time Brazil was the leading producer of cane sugar, but now it holds a low rank in that industry. This change did not come because of any alterations in geographical conditions in Brazil. It came partly because of the rise of bounty-supported beet sugar in Europe; partly because of the abolition of slavery in Brazil; and partly because of the more efficient and intelligent methods introduced in Cuba, Porto Rico, and Hawaii, but which the Brazilians have not adopted.

Two British cotton commissions which visited Brazil during the last decade frankly told the people of that country that their relative failure as cotton growers is not due to any lack of favorable natural conditions in Brazil. Natural conditions were pronounced to be nearly ideal. The failure lies with the people themselves who persistently fail to adopt modern methods of growing, grading, and marketing their cotton.

For similar reasons of unintelligent methods of production, Brazil is failing to hold her own in cacao production, and has been completely outstripped by the British African colony, the Gold Coast.

THE RUBBER INDUSTRY OF THE AMAZON BASIN.—But the most impressive case of the collapse of a great industry because of changes in remote parts of the world is seen in Amazon rubber. Only a short time ago, the Amazon basin was thought to have a natural monopoly of rubber production. Here nature seemed to have created the one ideal place for the growth of rubber trees. In 1900 the Amazon basin was supplying the greater part of the world's rubber. It was Brazil's second greatest export. No one anticipated that this established industry, intrenched as it was in its native habitat, could be swept almost out of existence by the competition of plantation rubber, brought to remarkable perfection in a region that formerly produced little or no commercial rubber. Yet, that is what happened. Brazil's rubber-collecting industry grew to greatness in response to the rising demand for rubber in the wealthy nations of the north, notably in the United States. Had the demand for rubber not risen above the bicycle stage,

There are separate national organizations of plant and animal ecologists, of meteorologists, of soils men, of foresters, but there has never been, so far as I am aware, any desire to form a separate organization of physiographers. They and their work have been traditionally included with geography, and such inclusion has probably been a benefit to the rising science of geography. I believe, however, that when parts of physiography and climatology are included in geographical descriptions they are to be used for the aid they can be to human geography and not as ends in themselves. I am

Brazil might have met the requirements. The Far Eastern plantations might not have had the tremendous stimulus that the automobile brought. The rising wealth of the people of the United States gave them a purchasing power that furnished a market for millions of automobiles. This demand for rubber made it profitable to invest great sums of British money in rubber plantations; made possible large-scale production of rubber which brought prices to a ruinously low level, and virtually stopped the Amazon rubber-collecting industry. But throughout all these changes the natural conditions in the Amazon Valley remained the same. In so far as rubber collecting was man's adjustment to the environment of the Brazilian jungle, the industry was made and was then unmade by events in a different part of the world. Recently a British legislative act resulted in more than quadrupling the price of rubber, and the Amazon industry may be restored, perhaps only again to be depressed by some other act of people in far distant lands. Favorable geographical conditions in Brazil make rubber production possible. Equally favorable geographical conditions in the Far East, coupled with more favorable labor conditions, and backed by British capital and enterprise, placed Brazil at a disadvantage and for a time, at least, nearly ruined one of her greatest industries. Somewhat similarly the once important cinchona bark industry of Peru has all but disappeared. The Dutch carried the plant to the East Indies, established plantations there, and now monopolize the production of the raw material of quinine.

SUMMARY.—Examples need not be multiplied in an effort to illustrate what seem to be certain fundamental truths of human geography:

1. That man's adjustment to natural environment is not to be thought of as a mere accommodative process by which he yieldingly fits himself into his natural surroundings. This may be true of very primitive men, but highly developed men conquer unfavorable elements in a region and make it over to serve their own needs.

2. Geographical conditions in a given region may supply few or many opportunities, but it is intelligent, purposeful, enterprising men who translate opportunities into great realization.

3. That the races and peoples of mankind ranging all the way from savagery to high civilization, differ widely in their aptitudes and

persuaded that the strict restrictionists among American geographers do not desire that all description and explanation of the physical features of a region shall be taken out of geography. I believe they desire that such descriptions and explanations shall be only such as are immediately needed for the understanding of the human geography of the region. In short, so much of the physical geography as is immediately needed for the appreciation of human adjustments is an essential part of geography. More than this is not geography.

tendencies, and cause very different adjustments to similar natural environments.

4. That particular adjustments to a regional environment are often influenced as much by circumstances wholly outside of the region as by those within the region.

5. That the progress of knowledge, of invention, of communications, and of wealth, causes progressively different kinds of utilization of natural opportunities to be made in the same region. *Permanent* adjustment by a progressive people can not be imagined.

6. That the most significant developments in a new country or continent, such as South America, are due to the initiative of people from a quite different environment, naturally from more advanced regions.

7. But, in the last analysis, it is probable that certain regions and peoples are advanced mainly because of the highly favorable environments in which the race has evolved: that their initiative, energy, and intelligence are products of underlying environmental factors operating upon these peoples for long ages. It is the old question of race versus place; and the geographer will hold that the *masterful race is the product of the place that nourished it*. And so our cycle returns upon itself—the *place makes the race and then the race progressively remakes the place*.

CENTRAL AMERICAN RAILWAYS AND THE PAN-AMERICAN ROUTE

By ROBERT S. PLATT

History of the Pan-American Railway Movement.—The isthmus of Central America is often thought of as a link connecting North and South America. For many years it has been looked upon as a potential highway. While the project for a canal to cut the isthmus from sea to sea was before the world, a project for a railway to traverse the isthmus from continent to continent was proposed. In the 1880's various bills were presented to the Congress of the United States in furtherance of such a scheme. In 1890 an International American Conference recommended the appointment of an Intercontinental Railway Commission to survey the route and to carry forward the project. The Commission was appointed, the survey was made, and the report was published in five volumes.¹ All-rail transportation from New York to Buenos Aires, passing through or connecting with all the capitals of Central and South America,—*this was the objective.*

Since that time the idea has not been lost. It is represented not only in Pan-American expressions of policy but also in active railway enterprises,—the Pan-American Railway of Mexico and the International Railways of Central America.

Meanwhile, the isthmus as a barrier between two seas has been cut by the Panama Canal. But the isthmus as a bridge between two continents is still nothing but an idea. No bridge crosses the Panama Canal. Few men, if any, have traveled by land from one continent to the other, and the accomplishment of such a journey even now would be a major undertaking for an exploring expedition.

Unfavorable Conditions.—The area of Central America is less than that of Texas. From end to end of the isthmus there is considerable uniformity in natural features, in resources, in people, and in problems of development. Nevertheless it is with good reason that it is divided into seven separate political units. The almost continuous strips of highland and coastal lowland are not occupied by a continuous zone of population. (Fig. 1.)² Conditions are unfavorable for even distribution

¹ Intercontinental Railway Commission: "Report," Washington, 1898.

² This map is a preliminary rather than a final product. More research and field work, and better Central American census figures probably will disclose errors. The dot distribution is based on estimates by provinces or similar divisions, of which there are 22 in Guatemala, 6 in British Honduras, 16 in Honduras, 14 in Salvador, 20 in Nicaragua, 7 in Costa Rica and 8 in Panamá. Within provinces dots are distributed in accordance with observation or indirect information of more or less value. Groups of less than 5,000 people are not shown.

of people. Certain favorable areas, particularly in high valleys among the volcanic mountains of the Pacific slope, support relatively populous communities, each the center of its own sphere of influence and each separated from its neighbors by miles of unproductive, almost impassable country. The more important of these isolated population groups are the nuclei of the Central American countries.

In Costa Rica the bulk of the population and the center of national life are in a highland basin,—the whole extent of fertile land and all the cities visible at a glance from a neighboring slope and quite surrounded by rugged, uninhabited mountains. The heart of Panamá lies hundreds of miles away at the crossing place of the isthmus, extending its political influence over intervening minor groups of population. On the opposite side of Costa Rica is Nicaragua, its population focused on fertile plains by the lakes. Farther on are Honduras, Salvador, and Guatemala, each having a highland population more or less compact and isolated, each extending political influence over minor groups and unoccupied territory nearby. A remote group of lumber camps on the Caribbean coast has escaped the influence of any of these to form the colony of British Honduras.

These communities have always been essentially independent of each other economically, both in the old days of self-sufficient local production and in the modern days of world commerce. They have been as isolated from each other as if they had been islands. In most cases intercourse between them is by water to the present day. They have never traded much with each other, but always with the commercial nations of Europe and North America. Their products and needs are generally similar.

Distribution of Lines at Present.—Railway building has followed the lines of most convenient traffic flow, in many cases lines established centuries ago. The aggregate length of existing railways is about 2750 miles. This is more than enough mileage to make a line from North America to South America. Yet the arrangement of these railways is at cross purposes with the proposed intercontinental line. A large proportion of the existing mileage is obviously unsuited to furthering a through railway and cannot be expected to form any part of it. There has been unanimity of purpose among railway builders of Central America and their purpose has *not* been intercontinental railway transportation. (Fig. 2.)

There are about 30 railways, public and private, in Central America.*

* U. S. Bureau of Foreign and Domestic Commerce: "Railways of Central America and the West Indies," Trade Promotion Series No. 5, Washington, 1925. This bulletin contains the most nearly complete information on each of the Central American railways. It has been used freely in formulating the statistics which follow.



FIGURE 1. Population



FIGURE 2. Railways.

A few of these make connections with others so that there are altogether 25 detached railways or railway groups. Twenty-four of these railway groups,⁴ comprising more than 99 per cent of the total mileage, have termini on navigable water. Sixteen of the 24 groups, comprising 97 per cent of the total mileage, have termini at seaports, and the other 8 on navigable waterways giving outlet to seaports. In three cases⁵

⁴ All but one little sugar mill line in Panamá.

⁵ Guatemala, Costa Rica and Panamá.

there are termini on both the Pacific and the Caribbean coasts. Yet transcontinental traffic is not of importance except on one of these lines, Panamá. In the other cases transcontinental connections have been incidental. On each of the railways traffic originates at interior centers of production and flows toward the sea, or vice versa. The route in practically every case is the best available one to connect the interior district with the sea. Naturally much of the mileage is transverse to the coast and not parallel to it. From the traffic point of view these railways are not detached units; they are ramifications of the main highway system, which is the sea.

The Railways Classified.—Each of the railways provides connection with the sea highway for the special commerce of particular districts. There are striking differences in districts, making it easy to distinguish several different types of railways.

Six railway groups or parts of groups serve six interior districts of relatively dense population.⁶ (Fig. 2.) All of these districts are productive spots, settled, with one exception,⁷ long ago, and organized as self-sufficient communities before the days of railways. The railways carry to them the miscellaneous merchandise of modern trade and carry from them into the streams of world commerce some of the products in which they can now specialize, notably coffee. These railways find also some local traffic to carry. They carry the commerce of about 80 per cent of the population of Central America. Their aggregate mileage is about 40 per cent of the mileage of Central America.

A greater mileage with a traffic of greater volume and less variety is devoted to relatively new districts, not settled before railway days and only sparsely settled now, containing hardly five per cent of the population of Central America. The impulse for development has come from without, the districts have been chosen because of their possibilities for producing certain commodities desired elsewhere, and the railways have been built to facilitate development. (Fig. 2.)

Five logging railways which tap forests back from navigable waterways make up one per cent of the mileage.⁸ A railway connecting a manganese mine with the coast adds a fraction of one per cent.⁹ Several lines to carry sugar cane from fields to mills or sugar from mills

⁶ Guatemala, Verapaz in Guatemala, Salvador, Nicaragua, Costa Rica, and Chiriquí.

⁷Chiriquí.

⁸Two in northern British Honduras, two in northeastern Nicaragua and one in eastern interior Panamá.

⁹ In Panamá northeast of the Canal Zone.

toward market make up two per cent of Central American mileage.¹⁰ Finally, a large proportion of the mileage, about 50 per cent of the total, carries bananas from plantations to ports. In comparison with these highly organized banana systems, too intricate to be shown in detail on a map of small scale,¹¹ the little lines for logs, ore, and cane are insignificant.

One other line remains to complete the total, the Panama Railway, comprising about six per cent of Central American mileage. This designedly transcontinental line was built to connect Atlantic and Pacific ocean traffic and serves no interior center of production.

It is evident that each of the various railways has been built to serve definite and particular purposes. They are located where they are needed and where there is traffic for them to carry.

What purposes would be served by an intercontinental railway? What need is there for such a line and what traffic would it find to carry?

Railways versus Ocean Carriers.—Is it likely that there would be through traffic between the United States and Argentina or other South American countries or Central American countries? In various places in the world rail transportation has an advantage over water transportation in being more direct, but in this case, for most of the intercontinental traffic, the water distance is shorter to every point. In many places in the world rail transportation is faster; but in this case water transportation is faster than rail transportation can reasonably be made. I cannot but think of a day in Nicaragua when a train passed me as I was walking beside the track. After it had passed I regretted that I had not tried to get aboard. On second thought, I decided to try after all, and so started to run after it. The train was the daily express moving at its regular speed. The conductor came out on the rear platform to encourage me. I found myself gaining and, after a short sprint, climbed aboard. This experience is not to be construed as a remarkable exhibition on my part; I have no reputation as a runner. Slow progress is typical and natural under Central American conditions. Extreme climate and rugged topography multiply the cost of improvements, and traffic needs are reasonably well served by light construction. Maximum grades and maximum curves are more than double the maximum on main lines in the United States. To provide facilities on a par with American railways, making possible

¹⁰ Two in southern Panamá and short connecting lines in western Nicaragua and northern Honduras.

¹¹ Such as Fig. 2

the transportation of heavy traffic at high speed, would indicate unjustifiable extravagance. American standards have been attained only on the Panama Railway, where special requirements are provided for by a generous government.

There is already rail connection between the United States and the southern tip of Mexico on the Guatemalan border. But rail traffic between the United States and southern Mexico is almost unknown. Apparently trade is carried on by the sea route, without even a pretense of railway competition. If this rail route is not used, is it reasonable to expect traffic to follow the same route farther, between the United States and Central or South America?

Prospects for Local Freight.—The prospect for through freight on an intercontinental railway does not appear promising, but there is still the possibility of local traffic. Existing railways carry some local freight, and there is a little commerce between countries even without railways. However, this possibility has apparently little to offer. As already indicated, most of the commerce of Central America is not with neighboring countries but with the commercial nations of middle latitudes. Even this principal commerce is not enough to afford very heavy work for the existing railways. Traffic density is far less than on active North American systems. In Central America annual traffic is approximately 50,000 ton miles per mile of line,¹² as compared with an average of more than 1,000,000 ton miles per mile of line on Class I railways in the United States,¹³ a density twenty times as great. This does not seem surprising when it is recalled that Central America has a population of less than 30 per square mile; that this population has small production per capita; and that the commodities produced are largely for home consumption and do not enter into commerce. These facts do not promise well for a railway across the grain of traffic. If the greater foreign traffic is not enough to be very profitable then the lesser traffic within Central America is much less likely to support a railway.

Present Status of Pan-American Railway.—Yet the Pan-American Railway is now being built. Some sections have been in operation for several years, some have been opened recently, and some are under construction, advancing through the forest mile by mile, financed by American capital, directed by American business men. These Amer-

¹² International Railways of Central America: "Annual Report, 1924," Jersey City, N. J., 1925.

¹³ Interstate Commerce Commission: "Statistics of Railways in the United States, 1923," Washington, 1925.

icans are able leaders who have been successful in other Central American enterprises. The president of the International Railways of Central America¹⁴ is the same man who built the first railway to connect the interior of a Central American country with a Caribbean port,¹⁵ and who developed the first banana district, the beginning of the great Central American properties of the United Fruit Company.

Probably he is right again. The Pan-American Railway is being built not as a through line, as originally conceived, nor even as a local freight carrier from country to country, but in separate pieces as extensions of the older railways, which thus reach out in their respective territories until almost inadvertently they approach each other and are easily linked together. (Fig. 2.)

The sections now in operation have been built as integral parts of existing systems terminating at sea ports and they have been discussed as such already. Sections now under construction or about to be undertaken are short links opening up productive districts between important systems. Longer links through unproductive country are postponed indefinitely. Instead of the older railways acting as branch lines or feeders for the main Pan-American Railway, as some have suggested, it is probable that various sections of the Pan-American line will continue to function as branches of the older lines to the ports, increasing their tributary areas and so increasing their traffic, leaving traffic divides about the same as at present. Very likely the number of Central American ports will be neither increased nor decreased greatly in future. Ports are so distributed that probably most of those now in use will continue to serve nearby areas, and most new areas yet to be developed will be reached by the extension of railways converging on the already established ports. Thus railways paralleling the coast are not necessarily discordant lines "across the grain" of traffic but rather branches ramifying from the main arteries of traffic. The International Railways of Central America¹⁶ is a going concern which shows some profit on its operations, not by international nor intercontinental land traffic but by reason of the main line business of its branch lines to ports, which is only supplemented by the branch line business of its main Pan-American line.

Some traffic undoubtedly will cross traffic divides from country to country, and, whether or not there is much freight carried, the importance of the international connections will be considerable in providing

¹⁴ Minor C. Keith.

¹⁵ Costa Rica.

¹⁶ An American corporation controlling most of the mileage in Guatemala and Salvador.

closer communication between the hitherto isolated Central American countries. The railway may help to replace mistrust by mutual understanding and cooperation, and perhaps to pave the way for a political union of Central America, a dream hitherto beyond realization.

At present only one railway in Central America crosses an international boundary, and that one is a banana railway in northwestern Panamá, extending only a few miles into an isolated corner of Costa Rica. No capital city is connected by rail with any other. However, this will not long be so: the work now in progress to close the gap between the railway systems of Salvador and Guatemala¹⁷ should provide international transportation before the end of 1926. The building of this link is in line with the tendencies already pointed out: its chief significance, as recognized by its builders, is not to carry traffic between these two countries nor Pan-American traffic, but to provide a connection between Salvador and a port on the Caribbean.

It is planned also to connect more directly the sections of the Pan-American route in Guatemala and Salvador.¹⁸ At first glance this appears to be a clear case of international railway building. But even in this instance the usual motive, reaching the sea, predominates. The major reason for the line is that it will connect the productive Pacific slope of Guatemala with the Caribbean by a lower route than the difficult one up over the plateau through Guatemala City.

The Future of the Pan-American Railway.—Probably none of us will see New York and Buenos Aires joined by rail. There is no immediate prospect of a railway from the Canal Zone to Colombia. Panamá has always been like an island off the Colombian coast, never reached by land. But probably many of us will live to see the other Central American islands joined together, to travel from New York to Panamá by rail. Those who undertake this journey will give evidence of a spirit of exploration, traversing various regions even when it involves a slower, less comfortable and more expensive journey than the sea voyage. Very few will want to take the journey more than once. Probably there will be no more need of through observation cars than of through freight cars from New York to Panamá. The line should justify itself not by one long haul, but by many short hauls between various districts and nearby ports.

Theoretically Central America is a link connecting North and South America: practically it is a row of separate countries each facing the

¹⁷ North-south link, Fig. 2.

¹⁸ East-west link, Fig. 2.

sea highway, each like a house with its own front path down to the highway and its own side fences separating it from its neighbors. There may be much going and coming in every household, but anyone going the length of the block had better go along the highway than try to make his way across back yards and over fences.

TITLES AND ABSTRACTS OF PAPERS

MADISON, 1925

Chas. C. Adams.

The Status of Zoogeography in North America.

Zoogeography has made great progress in America during the past twenty-five years. Our ideas of its content have undergone considerable change; the dominance of the faunistic viewpoint has not prevented the increasing recognition of the ecological. Faunal genesis has progressed not only by paleontological advances but as well by more clearly formulated faunal methods. The ecological viewpoint, although developing more slowly than botanical plant geography, has made considerable progress and the need of a balanced treatment is becoming recognized. The great advances in our knowledge of heredity has tended to throw in clearer relief the relative importance of hereditary and environmental influences. Foreign zoogeographic work by Americans has, as might be expected, tended to follow the prevailing methods at home, and has been in the main faunistic in approach, although the ecological is gaining recognition.

John B. Appleton.—(Introduced by W. D. Jones.)

The Iron and Steel Industry of the Calumet District.

The manufacture of iron and steel in the Calumet District represents an effective adjustment to local and regional equipment. (1) An abundance of vacant, flat land, available in large blocks at relatively low prices; a lake front which could be readily improved for commerce, and along which new land could be built with slag; cheap and abundant supply of water; and proximity to Chicago, have proved to be the chief advantages of local equipment. (2) The ability both to assemble the requisite raw materials of the industry at reasonable costs and to distribute widely its manufactured products, is the outstanding regional advantage.

The cost of producing iron and steel in the Calumet District is lower than anywhere else in the country. This is attributable to the natural advantages noted above, to the very modern character of its plants, and to the higher scientific methods employed there.

The recent elimination of the "Pittsburgh Plus" system of basing prices which had restricted production in the Calumet District, should permit the free operation of geographic and economic factors. As a result, it seems highly probable that the Calumet District will become the chief iron and steel-producing center in the country.

Wallace W. Atwood.

Settlement and Economic Development of the San Juan Region
of Colorado.

In many ways the San Juan mountain area of southwestern Colorado illustrates most strikingly the influence of geographic conditions upon routes of travel, the location of settlements, human occupations, and the utilization of natural resources. About fifty years ago there were but few permanent settlements within the area. Mining camps were located at a few places and the life was characterized by the work of adventurous prospectors who were out in the hills day after day in search of bonanzas. A little mining was done, but chiefly by hand and the ore was packed out on the backs of mules or burros.

Within a few years prosperous mining centers were established, railroads were built, machinery was imported, electricity was generated, and the San Juan region became one of the leading ore producing districts in the United States.

The valley lowlands have now attracted farmers and ranchmen, the forests lumbermen, the high pastures shepherds, and the many beauty spots in the range are attracting hundreds of summer campers.

Within a period of about fifty years human activities have become somewhat well adjusted to the environment.

O. E. Baker.

Shifts in Land Utilization as Shown by the 1925 Agricultural
Census.

An Atlas of Economic Geography: Report of Progress.

W. O. Blanchard.—(Introduced by R. H. Whitbeck.)

The Landes—A Lesson in Conservation.

The French Landes of a century ago was a desolate, unhealthful, abandoned, sandy waste. Its flat surface underlain by an impermeable sandstone was transformed by winter rains into vast marshes, by the summer sun into a desert. An added menace in the 17th and 18th centuries was the invasion of the interior by migrating sand dunes which occupied the coastal belt.

Reclamation work began in 1787 had as its immediate object the fixation of the dunes by planting with pines. The success of this work stimulated the drainage and planting of the rest of the Landes and by 1892 some two million acres of pine forest had covered the waste.

The Landes today is the home of a happy industrious population of 2,400,000 and is a noted health resort visited by some 250,000 annually.

In the Landes, turpentine is king and a scheme of tree growth, turpentine, and wood cutting has been worked out which gives a continuous and substantial annual income. The trees are tapped over a period of thirty to fifty years without injuring the timber value. Contrast this with our "mining" methods in which we "bleed" the pines for three to six years only. Their naval stores industry is on a permanent basis with a growing output; ours a transient industry constantly moving to new forests and with no attempt at replacement.

G. E. Condra.

The Relation of Surveys to the Basic Things in Geography.

(No abstract presented.)

D. H. Davis.

Objectives in a Geographic Field Study of a Community.

Although divergent views as to the character of the treatment which should be accorded to the material within the undebated portion of the field of geography still exist, American geographers in general agree that only facts of habitat significance lie within the scope of a geographic field study and a beginning has been made in an investigation of the technique of gathering and recording such facts. Despite progress in these directions, the definite objectives and the direction and extent of the initial studies have received far less consideration, though these questions must be settled before effective work can be done.

In view of our concept of the field of geographic inquiry, any complete community study must embrace both rural and urban areas in consequence of the interrelationships which exist between an urban center and its "trade territory." Suggested objectives to be attained in such a community study embrace as a minimum:

1. Delimitation of the community.
2. Establishment of quantitative relationships between urban and rural elements.
3. Interpretation of "anomalies" of the facts of habitat significance, including those of the interrelationships of the various elements of the community.
4. Formulation of a program for improvement of conditions within the area.

To be of maximum effectiveness, such surveys cannot consist in major part of a perfunctory verification of facts of common knowledge which is practically unavoidable if an area embracing a large urban center is selected, as quantitative studies of value cannot be made of such areas without extensive cooperation and backing which the geographer will not be able to secure until he has proved the social value of geographic studies. For this reason, our efforts should for the present be confined to small communities without complex relationships.

Oliver L. Fassig.

Rainfall in the Caribbean Region.—Read by Title.

During the past five years daily rainfall records have been published for more than 500 stations in the West Indies, Central America, and along the north coast of South America, under the auspices of the U. S. Weather Bureau in cooperation with 35 to 40 local climatological organizations. Normal monthly and annual rainfall values have been computed for many individual stations and for most of the islands and states within the Caribbean Region. Significant fluctuations in the value of the annual rainfall were shown for the period from 1850 to date.

V. C. Finch.

Culture and Landscape at Madison, Wisconsin.

The cultural features of the landscape at Madison, Wisconsin, display somewhat unusual conditions due to the fact that the site was chosen for its scenic beauty and for the purpose of locating the political and educational center of the state. It is clear that numerous concessions have been made to conditions of the natural landscape in the location of public buildings, the courses of the railways, and in the location of industrial plants. That advantageous features of the natural landscape have been capitalized is shown by the arrangement of the several classes of residential and commercial properties, by the location of recent urban and suburban real estate developments, the location of playgrounds, and by the general distribution of land values.

John W. Frey.—(Introduced by V. C. Finch.)

The Iron and Steel Industry of the Middlesborough District.

The iron and steel industry of the Middlesborough region differs from that of the other producing centers of the United Kingdom in

that it was not located on a coal field, but near the Cleveland iron mines on the banks of the Tees River. The Tees River at the time the industry was started was too shallow to be important in overseas transportation; while the sites chosen for the first works did not ignore the possibilities of the river, yet, the primary reason for their location was nearness to the iron ore. Although the industry was not located to be near the coal, nevertheless the high quality and abundant coal of the contiguous Durham field contributed much toward the success of the Cleveland industry.

The deepening of the Tees River and the confining of the channel, by the filling in of marsh land with furnace wastes, has made it possible to put foreign iron ore on the blast furnace wharves without any railway haul. This created a condition favorable for the development of the hematite iron industry. Incidentally, the improvement of the river and the recovery of marsh land has given Middlesborough an advantage in the export trade, besides creating more river margin land for additional iron and steel works.

J. Paul Goode and O. E. Baker.

An Atlas of Economic Geography: Report of Progress.

(No abstract furnished.)

Raus M. Hanson.—(Introduced by Nels A. Bengtson.)

Geographic Factors in Railroad Revenues of Nebraska.

Nebraska's rainfall gradually decreases westward from 32 to less than 16 inches per year, and the state may be divided into ten north-and-south belts based on a two inches decrease for each. Those belts crossing similar soils show decreasing revenues as rainfall decreases. Excepting the belt over-weighted with industrial Omaha's revenues, the average income per railroad mile in the remaining belts is nearly uniform. The westernmost belt having irrigation pays nearly twice the average income per mile. This apparently indicates that each rainfall belt is fairly comparable with the others in supporting each mile operating within its boundaries, and that only the westernmost should expect a probable mileage increase.

Nebraska has three distinct soil regions: the Loess Region, Sand Hills, and High Plains. In 1924, the railroads received \$2,102.25 as average revenue per square mile of the Loess Region, while a High Plains section paid one-third as much. Each Sand Hill section paid an average revenue of only five per cent of that from the Loess Region.

The average earnings per railroad mile within the Loess Region were \$17,944.97, as compared with \$11,648.89 within the High Plains, and only \$7,546.73 within the Sand Hills.

The relationships suggested by these data indicate the degree of effectiveness with which soil and rainfall affect the average railroad revenue per square mile in Nebraska and also their effects upon the mileage income within each region.

R. Hartshorne.—(Introduced by D. H. Davis.)

Factors in the Localization of the Iron and Steel Industry.

The relative importance of the various factors influencing the location of the iron and steel industry is not adequately set forth in any published study. The general rule that the industry is located in or near coal fields, expressed in the adage "Iron moves to coal," holds true in most cases but with numerous exceptions of major importance. The purpose of the paper was first, to show that this rule has never been adequately explained, second, to test the extent to which it may be generally applied, and third, to offer tentative hypotheses to account for the general rule and for its exceptions.

The simple explanation commonly given for the rule, namely that "it takes two tons of coal to smelt one ton of iron ore" is not satisfactory because it is not true. Less than one ton of coal, in certain cases as low as half a ton of coal, is needed to smelt one ton of iron ore. To produce finished steel products of the steel mill however from iron ore, the total amount of coal needed for smelting, fuel, and power may amount to as much as 1.4 tons of coal for each ton of ore, in the case of the high grade Lake ores of the United States, but where low grade ore is used it may be as low as two-thirds of a ton per ton of ore.

This latter fact accounts for the exception to the general rule found in Lorraine where two thirds of the ore which is of very low grade, was, before the war, smelted locally with imported coal, rather than shipped out to the coal.

The large movement of pig iron, however, from the Lorraine furnaces to outside coal fields, and in part, the movements in the United States and other countries of ore for iron and steel mills in coal fields, cannot be accounted for on the basis of coal requirements, but is due to the fact that the principal markets for the finished products of the industry are developed in areas rich in coal, because of the preponderant importance of coal for fuel and power in the industries which provide the market.

To explain adequately the location of the iron and steel industry a series of ten hypotheses are suggested. The more important of these may be summed up by saying: (1) there are three major factors influencing the location of the iron and steel industry: location with respect to the ore fields, the coal fields, and the markets, respectively; of which the latter, or "market" factor is somewhat more important than the others, while the relative importance of the "ore" factor, as compared with the "coal" factor, varies inversely with the grade of the ore; and (2) in most cases the steel mills are located in or near coal fields, that is, iron does move to coal, in part because of the large amount of coal required in the steel industry, nearly as much, in the United States more than, the amount of ore itself, but in greater part from the fact that the markets are developed chiefly in or near the coal fields.

Several methods were suggested for testing the validity of these hypotheses.

C. C. Huntington.—(Introduced by Eugene Van Cleaf.)

The Main Divisions in the Classification of Geography.

Geography is a dynamic science. Activity or change is one of its most fundamental principles. The *descriptive stage* of fifty years ago, when geography was classified as mathematical, physical, and political, was succeeded by the so-called *scientific stage*. Then it became the *science of distribution*. This idea of distribution as the distinguishing characteristic of geography still lingers in some quarters, notably in England.

In America, however, early in this century geography entered the environmental or *biogeographic stage*, becoming the relation between the earth and its living inhabitants, a combination of (1) physiography, (geoplanetology, meteorology, oceanography, and the physiography of the lands), and (2) ontography (phytogeography, zoogeography, and anthropogeography). It may be objected to (1) that these are non-biological sciences, whereas geography deals with life; and to (2) that plants and animals belong in the environment; also that botany and zoology deal with adaptations of life to environment.

Recently geography seems to be entering the *social phase*. Defining geography as the study of the reciprocal relations between man and his environment, we find a logical classification to be: (1) physical; and (2) social geography. Both deal with the essential geographic function, the relation between man and environment. Physical geography treats it from the side of the environment, whereas social

geography examines it from the point of view of man and his activities. The sub-divisions of physical geography are naturally those dealing with the relations to man of each of the great environmental factors. Thus we have the geography of the land, the geography of animals, etc., in each case some attention being given to its relation to man. Social geography logically subdivides, according to the classification of man and his activities, into racial, economic, political, military, historical geography, etc.

Preston E. James.—(Introduced by Kenneth McMurry.)

A Geographic Reconnaissance of Trinidad.

The development of the present geographic landscape of Trinidad has proceeded in three stages of adjustment. Each of the major districts—the Cacao, Sugar, and Coconut Districts—represents a slightly different point in the succession. The first stage is characterized by a haphazard, extensive use of the more accessible high grade sites. Thus the first cacao estates were located on the best cacao land to be found in Trinidad. The early sugar plantations around San Fernando were located in the best sugar community of the island. The localization of the coconut industry is a more recent indication that this industry also is to pass through the first stage of adjustment. But cacao and sugar have passed beyond this stage, and now the coconut industry also, is entering the second stage.

This second stage is characterized by a complete loss of harmony between the natural and cultural forms of the landscape, when, under the stimulus of prosperity and cheap land, crops are being grown on sites which are relatively low grade. Because these lands are inexpensive, and because, being virgin, they still possess some soil richness, it is possible to make considerable profit off them. In fact this stage is usually a period of great prosperity. Sugar at one time had spread thus to most parts of the island; cacao at the present time is greatly over-expanded; and coconuts are beginning to lose the early harmony of adjustment in their spread to other parts of the island outside of the coconut districts. However, sugar has passed still further, beyond this stage, and cacao is in the agony of transition.

The third stage is characterized by a renewed harmony between the cultural and natural forms. The better sites are used, and intensive cultivation requiring large capital and labor investments increases the efficiency of production. Scientific studies are made of the land and varieties of crops well adapted to the varying conditions are selected. In theory this end stage would be reached when every plat of land

is used as efficiently as possible to produce those things for which it is best adapted. Actually, however, such close adjustment may be interrupted by the invention of machines, the spread of crop pests, the ravages of war or political over-turns, or by the many natural and human events which change the normal courses of things.

In Trinidad only the sugar district has entered this stage, and even in the sugar district adjustment is far from perfect. The cacao and coconut industries will probably follow the lead of the sugar industry in establishing, sooner or later, a closer geographic adjustment, unless the progress of adjustment is interrupted by unforeseen events. Without a fuller knowledge of the soil, drainage, and other critical forms of the island, the trend toward adjustment must necessarily be groping and uncertain in its direction. A systematic land classification is the only substitute for inefficient trial and error. With a stable government, rich resources, varied natural conditions, which lead to varied industries and consequent economic security, and with an energetic and progressive people, Trinidad should be well able to take advantage of the increasing demand for the tropical products which can to such advantage be grown there.

Wellington D. Jones.

Lantern Slide Sets to Illustrate Regional Geography.

In teaching regional geography, at both the higher and lower levels of instruction, it is most desirable to have well selected photographs to supplement written sources of information and maps. A committee of the Association of American Geographers has considered the problem of assembling and making available at a reasonable cost sets of photographs for selected regions, and has concluded that for the present at least its efforts can best be directed towards collecting lantern slides. Each set of slides is to be prepared by a specialist on the region, the set to be accompanied by a concise digest of the geography of the region, and each slide to be accompanied by a short statement of the salient points illustrated.

The set of slides on Old Japan presented to the members of the Association at the Madison meeting illustrates what the committee has in mind, and affords a specific example for criticism and suggestion.

Mary J. Lanier.—(Introduced by H. H. Barrows.)

The Earlier Development of Boston as a Commercial Center.

Within three decades of its founding, Boston had grown to a prosperous maritime town, its commercial interests the dominant ones.

Before the close of the first decade, it had become the market town for the pastoral and agricultural communities upon the neighboring lowland, and its merchants were importing in English bottoms commodities needed by the settlers.

Within the next two decades an important export trade was developed. By assuring an outlet for surplus products, this greatly stimulated the varied economic activities in the area tributary to Boston and strengthened the position of Boston as a market town. The building of fishing boats and trading vessels, the pursuit of the fisheries, the assembling and preparation for export of primary materials produced in tributary areas gave employment to many inhabitants of the town.

By 1660 Boston held unquestioned leadership as an exporting and importing center for New England. Its merchants had a lucrative trade with other English continental possessions, with the West Indies, and with Mediterranean Europe. With commodities secured in this trade, they supplied the local markets and paid for English manufactures.

Thus early were laid the foundations of commercial activities which were to dominate the life of the people of Boston for at least two centuries.

A. K. Lobeck.

Porto Rico.

Porto Rico is essentially a rugged mountain area standing athwart the course of the trade winds. Abundant rainfall is experienced throughout the island except on the southern or leeward side which is a plain of alluvium at the foot of the high mountain area. On the north coast there is a similar plain but well watered. These two alluvial plains are devoted largely to sugar growing, the one on the south being under irrigation. Other isolated and much more restricted alluvial plains are found at the east and west ends of the island where drowned bays have been filled with debris brought down by the active rivers from the interior. Each of these plains is entirely given to sugar growing, the life of each one focused on a village in its center near which the "central" or sugar mill is located. In a word, sugar growing is confined to the alluvial plains of the island, usually near local points of shipment by boat. Coffee is grown throughout much of the mountainous interior, remote from shipping points, the product coming out by devious and difficult trails. Locally in the limestone area of the north coast and convenient to the port of San Juan, citrus

fruits and pineapples are important and in the small interior valley of Cayey tobacco is the special crop due perhaps to the slightly lesser rainfall and the better drying conditions.

K. C. McMurry.

A Study in the Use of Soil Types in Geographic Mapping.

The necessity of a better appreciation of soils in the mapping of areas in detail is becoming more obvious as field methods are refined. An approach to the problem is the effort to adapt the more recent work of the United States Bureau of Soils, and allied Bureaus, to geographic use. A study of Sylvan Township, Washtenaw County, Michigan, in which standard soil types were mapped in conjunction with the mapping of other geographic forms seems to suggest the feasibility of this method of approach.

Howard H. Martin.—(Introduced by Nevin M. Fenneman.)

Geographic Phases of the Cincinnati Resource Survey.

The Cincinnati Resource Survey is an attempt to set forth scientifically and economically the natural adjustment of Cincinnati to the surrounding region, and to state how that adjustment may be improved by additional industries or by extending some and perhaps even by contracting others. This work is being carried on by the Department of Geology and Geography at the University of Cincinnati. Eight men of the department are working part time on the Survey, the geologists investigating the utilization of such raw materials as coal, coke, cement, salts, fertilizers, glass sand, etc., while the geographers are concerned with timber supplies, tobacco, dairying, the textile industry, river transportation, and various geographic problems. It is believed that this Survey of all the resources which may or might be subsidiary to Cincinnati's industries is the largest study of geographic adjustment yet attempted by any American city.

Robert S. Platt.

Central American Railways and the Pan-American Route.

There are twenty-five separate railway systems in Central America. Twenty-three of these (99% of the mileage) have termini at ports. Traffic originates at interior centers and flows toward the sea, or vice versa. From the traffic viewpoint these detached systems are ramifications of the sea highway.

Forty per cent of Central American mileage carries the commerce of eighty per cent of the people, in six densely populated districts. Fifty-four per cent of the mileage serves districts containing hardly five per cent of the people, producing commodities for export: lumber, minerals, sugar, and, above all, bananas.

The total mileage is enough to make a railway connecting North and South America. But the railways are transverse to the route for a Pan-American railway. There is hardly any land traffic between adjacent Central American countries.

A Pan-American railway probably would not carry through traffic because it could not compete with faster, cheaper water transportation; nor much local traffic, because the countries trade with the northern commercial nations and not with each other. Nevertheless it is being built by the extension and linking together of existing railways. Its function will be to provide not one long haul but many short hauls between various districts and nearby ports.

Richard J. Russell.—(Introduced by C. O. Sauer.)

Landslide Lakes of the Northwestern Great Basin.—Read by Title.

In the Basalt Capped Region of the Warner Mountains and the adjacent part of northwestern Nevada, a number of lakes are developed caused through blocking by landslides. These lakes are characteristic in form and very definite in distribution. The paper was a form study of a significant constituent of an important natural landscape.

Helen M. Strong.

Cargo Movements of American Foreign Trade.

Three regions are of outstanding importance in cargo movements of American foreign trade,—eastern United States, Atlantic Europe, and Middle America. In the ports of eastern United States, which includes the Gulf, three-fourths of the export and import water-borne tonnage of this country departs and arrives. All cargoes for export from the United States in 1924 weighed more than 41,000,000 tons, while imports bulked upwards of 37,000,000 tons. Considerably more than half of the export and import tonnage belongs to Atlantic Europe and the Caribbean-Gulf-of-Mexico region, while four other regions—the Mediterranean, the Middle and Far East, and

Australasia, the eastern, and the western coasts of South America—divide nearly all the remainder among them. Such are the broadest aspects of our cargo tonnage movements, notable for their concentration between three contrasting areas located at no great distance apart. This in itself is a significant fact but as is usual with grand totals or averages means little unless a comparison is made (1) between the inbound and outbound cargoes as to type and bulk, and (2) between the regions themselves as to trade capacity.

A view of the principal regions concerned with this foreign trade reveals contrast and similarities as compared with economic and geographic conditions in the United States.

Eastern United States handles most of the water-borne foreign commerce of the country. The North Atlantic District from the Canadian border to Hampton Roads takes care of nearly two-thirds of the exports and imports for this region, the Gulf accounts for somewhat less than one-third and the remainder moves in and out of South Atlantic ports. The total exports from the Pacific Coast amount to about 9,000,000 tons, while the imports are approximately 2,500,000 tons. The Far East and Atlantic Europe are of most importance in Pacific Coast trade.

Imports of industrial raw materials form by far the largest item in our foreign trade amounting to 24,000,000 tons. Of this, tanker cargoes, principally petroleum, make up more than 15,000,000 tons. Iron ore, logs, and nitrate are of considerable importance in the remaining tonnage.

Exports on the contrary are rather evenly divided in bulk among industrial raw materials, unmanufactured food stuffs, and manufactured articles. Manufactured articles come first with more than 16,000,000 tons, each of the other two groups being only slightly less than this amount. More than half the industrial raw materials and almost all the manufactured articles and unmanufactured foodstuffs imported enter the United States at North Atlantic ports. From these same ports go most of the unmanufactured foodstuffs; but exports of industrial raw materials and manufactured articles are divided about equally between North Atlantic and Gulf ports.

Thus it is evident that (1) the economically well developed areas and those with a wealth of contrasting resources, such as climate or mineral deposits, bulk largest in our import and export tonnage, with most of it moving across the North Atlantic or through the Gulf and Carribean; (2) that the import and export movement between regions is unbalanced; (3) industrial raw materials are the largest item in imports, and manufactured goods in exports.

Lewis F. Thomas.—(Introduced by C. C. Colby.)

Localization of the Wholesale and Jobbing Industries in Metropolitan St. Louis.

The principal wholesale and jobbing interests of Metropolitan Saint Louis are remarkably concentrated in a relatively small, crescent-shaped area which extends westward and northward from the levee waterfront of St. Louis. These interests have occupied this site during four epochs of transportation which have characterized the growth of the city. These epochs are: (1) all-rail movement of traffic, (2) river-rail movement of traffic, (3) all-rail movement of traffic, and (4) rail-highway movement of traffic. In this study the conclusion is reached that the continuation of the wholesale and jobbing interests on one site under the vicissitudes of transportation development indicates the striking geographic quality of this site.

Frederick Jackson Turner.

Geographic Sectionalism in American History.

1. As the United States becomes a settled nation, about equal to Europe in area and resources, with provinces, or sections, analogous to European nations, regional geography demands increasing attention.

2. There has always been an actual sectionalism far more complicated than that of North against South, though concealed by the formal structure of the federal constitution and by party names. These sections are revealed by analysis of votes in congress and in party conventions. They have been exhibited in the following phases:

I. The three coastal colonial sections.

II. The frontier advance, involving

1. A sectionalism of East and West, changing as settlement progressed.
2. A struggle for power between the three original sections on the coast, each desirous of winning the West, economically, politically, and culturally.
3. The creation of new interior sections corresponding to the various geographic provinces reached and developed in the course of western advance.

III. The closing of the frontier movement accompanied by the increasing self-consciousness of the new sections. The replacement of extensive intersectional migration by readjustments within the separate sections.

- IV. Evidences of a tendency to evolve from the section a new governmental unit, intermediate between state and nation, by extra-legal sectional councils; by interstate compacts, permitted under the constitution; and by governmental and other administrative organizations.
- V. The place of the national political party extending into all sections, as a check upon sectionalism. But underneath party loyalty and a common name, are sectional wings, reflecting geographic antagonisms. Parties are closely divided, except in their strongholds, and in presidential elections these strongholds are found in the geographic regions whose economic interests and social traits are most reflective of the particular party's qualities. Although party loyalty and regional differences check sectional impacts, sectional voting often triumphs over party voting in congress and sectional bargains shape legislation.

Glen T. Trewartha.—(Introduced by R. H. Whitbeck.)

Recent Thought on White Acclimatization in the Wet Tropics.

The paper was an attempt to summarize down to date the trend of thought in the writings and research of recent authors on tropical acclimatization, almost exclusively those of leaders in the medical profession, for it is they who are best qualified to speak with authority on the subject. The discussion centered about the following topics:

1. Diseases and other indirect climatic influences of a harmful nature in the wet tropics.
2. Physiological, pathological, and psychological effects of a wet humid climate upon the bodies of white men.
3. The historical evidence for and against acclimatization.

There exist at the present time two distinct schools of thought with regard to the future of the white man in the wet tropics. The first group believes that the ill effects of tropical climate are due to the various concomitants, viz.: disease, proximity of inferior races, intemperance, etc. These factors are admitted to be handicaps to a successful white invasion of the tropics, but probably not insurmountable ones, and will eventually yield before the assaults of scientific discovery and the increasing demands of mankind for tropical products. The second school believes, that, with our present knowledge at least, true

acclimatization is impossible. If all of the so-called indirect climatic handicaps are overcome, there still remains the direct influence of tropical sun, heat, and humidity, which act upon the white man's body, and more particularly his nervous system, in such a harmful way as to bring about a debilitated, neurasthenic condition.

Stephen S. Visher.

Notes on the Geography of Jamaica, B. W. I.

Jamaica is strategically located for trade with the Caribbean Region and for dominating the eastern approaches of the Panama Canal. It is the oldest British Crown Colony and is English in language and in many other respects, and is loyal. However, the United States now dominates its commerce, and the desire for American annexation is growing. It is a favorable tropical area for English-speaking geographers to visit, having a stable government, good transportation, and many interesting aspects of its geography. Area 4,200 sq. mi.; population about 900,000, about 95 per cent colored. The negroes appear superior, on the average, to those in our South; this is locally explained as the result of selection at the time of importation, Jamaica and other sugar producing West Indies islands securing the better stocks and America the remainder. Chinese store keepers and Hindoo plantation laborers are increasing rapidly in Jamaica, and the whites are decreasing, there being only half as many as in 1791. However, in 1791 whites formed only one-tenth of the population. Only one-sixth of Jamaica is fairly level, most of it on the dry side, and not tilled. There has been a large emigration of laborers to Cuba, to the banana fields of Central America and to assist in the building of the Madeira Railroad and the Panama Canal. Sharp contrasts of rainfall occur, the annual average ranging from 30 to 150 inches; severe droughts occur, and the native vegetation is distinctly less luxuriant than the *average* rainfall would support. Numerous tropical cyclones occur. The banana crop was severely damaged for three successive years, 1915, 1916, 1917, leading to an expansion of the industry in the more remote but less frequently wind-damaged Central America. Costa Rica has now replaced Jamaica as the chief source of bananas. The insularity of Jamaica caused it to be poor in native food plants and animals. Nearly all the important kinds have been introduced. Jamaica is now perhaps no more overpopulated, relatively, than in 1494 when it contained perhaps only a tenth as many people as now.

Derwent S. Whittlesey.

An Experiment in Mapping a Small Section of the Door Peninsula, for Use in Geographic Study.—Published in December, 1925, *ANNALS*.

Frank E. Williams.

Philadelphia's Suburban Industrial Development (Delaware County).

The establishment of industries in the early period of the history of a region depends largely on geographical relationships. As the area settles and develops, other influences begin to play an important rôle and, in conjunction with the geographical factors tend to bring about a change in type and local distribution of manufacturing industries.

Pennsylvania is an industrial state and Philadelphia is an industrial port with a large suburban area which contributes important products from a few large and many small factories. The part played by the suburban industries in the development of the city of Philadelphia has always been an important one. Very early the Germans and other artisan immigrants from Continental Europe began manufactures in or near the city and the expansion of these industries was abetted and increased by the commercial aptitude of the Quakers.

All of the larger creeks tributary to the Delaware and Schuylkill have rapids and falls. Along these creeks the early mills were established. Some of these continue to produce in a small way, some have changed the types of products, some have been abandoned because of failures or have moved to other areas more favorable.

Recently large new plants have been established outside the city. All of these developments show an interesting interplay of the factors of power, early start, transportation, market, labor, land valuation, taxation and human initiative.

Ella M. Wilson.—(Introduced by Mark Jefferson.)

Aroostook County Potato Culture.

In the middle of the "forested wilderness" of Maine is Aroostook County, one of the most highly developed potato regions of the United States. The average acre yields are greater than anywhere else in this country and excel Germany's prewar average. The quality is excellent. The credit for this development has been given to the silty loam soil and the cool summer climate notwithstanding the fact that New

York, Michigan, and Minnesota have not only these advantages but accessible markets as well. The kind of men engaged in potato culture has been ignored. They are shrewd New England Yankees who have made the raising of potatoes as standardized and as efficient a process as the making of automobiles. But, potatoes like cars, must be sold and the people who eat Maine potatoes are a long way from the fields. The future prosperity of the region seems to rest upon a more efficient marketing of table and seed stocks and a paying use of "bumper crops" in by-products.

John K. Wright.

The History of Geography: A Point of View.—Published in December, 1925, ANNALS.

NEWS ITEMS FROM MEMBERS.—Robert Anderson traveled around the world, December, 1924, to July, 1925, by way of British Columbia, Japan, China, Manila, Singapore, India and Europe. During the winter of 1925 he was engaged in geological field work in Assam and the Punjab, India.

O. E. Baker and others from the Departments of Agriculture are collaborating on an "Atlas of the Physical Conditions and Land Classification of the Northern Great Plains." He has also in preparation "The Trend of Land Utilization in the Northern Great Plains Region;" "The Trend in Food Requirements of the People of the United States;" "The Agricultural Regions of North America," and "The Utilization of the Land in North America." He spent most of the field season of 1925 in Canada gathering data on land utilization and the possibilities of an increase of agricultural production in that country. At the New York meeting of the American Economic Association he presided at a round table on economic geography.

N. A. Bengtson reports a growth in the enrollment in geography courses at the University of Nebraska, from 99 in 1919 to 506 in the first semester of 1925-26. He has under way a manuscript on the Geology and Geography of the Permian area of Nebraska.

H. H. Bennett spent the winter season of 1925 in a study of the classification and reconnaissance of the soils of Cuba. He worked with the cooperation of the Tropical Plant Research Foundation and the Cuba Sugar Club. In the summer he was in soil classification studies on Long Island and in New Jersey and several other states. He has in process of publication "Some Important Soils of Cuba and Their Relation to Agriculture," "Some Comparisons in the Properties of Humid-Tropical and Humid-Temperate American Soils, with Special Reference to Indicated Relations Between Chemical Composition and Physical Properties," and "Some Comparisons Between Temperate Zone and Tropical Soils, with Special Reference to Sub-base Conditions."

Eliot Blackwelder, during the winter of 1925, made studies of the geomorphology and the processes of weathering in the deserts of southeastern California. The summer was spent in studying the Precambrian rocks of the Medicine Bow Mountains of Wyoming, Red Creek, Utah, and the Ruby Mountains of Nevada, with physiographic studies between these points and California.

William Bowie recently was elected a Corresponding Member of the Russian Geographic Society.

Albert Perry Brigham, retired from active teaching at the close of the academic year, 1924-25, and will now give his time to geographic work. Colgate University recently conferred upon him the degree of Doctor of Laws. He spent several months of the summer and autumn in European travel.

Chas. F. Brooks is continuing his studies of ocean temperatures in relation to seasonal weather. With research assistance provided in part by Clark University particular attention is being given the Gulf Stream and other Southwestern Atlantic waters. A paper on this subject has been submitted to the U. S. Weather Bureau for publication.

Robert M. Brown has prepared the geography sections of a cooperative survey of "The Social Studies." Political science, economics, sociology, history, government and ethics also are included in the survey. He also is preparing chapters on Explorations in the Americas, and Explorations of Interest to Americans, for the 1925 American Year Book.

Kirk Bryan pursued his studies of physiographic processes in arid regions, in connection with his regular work on the geology of ground water and problems in engineering geology. He also continued as geologist to the Pueblo Bonito Expedition, for the National Geographic Society. He again visited Chaco Canyon, N. M., and made progress in unravelling the story of the alluvial deposits of the canyon with respect to the life and habits of the peoples who once lived in Pueblo Bonito.

Frank Carney is in charge of the Geology and Land Departments of the National Refining Company.

N. H. Darton spent the summer of 1925 in western Texas investigating the geology of the Guadalupian group and mapping upper Permian in the northwestern part of the state. He recently was elected President of the Geological Society of Washington, and is now a member of the Council of the Geological Society of America. He reports in progress: "Reports on the Red Beds of New Mexico," "Structure of Northern Anthracite Coal Basin," "Topographic Map of South Dakota," "Physiography of Arizona," and "A Geographic Map of New Mexico."

William Morris Davis lectured during January and February of 1925 at the University of California and later gave a series of lectures

at the University of Utah, Grinnell College, and Colorado College. He gave his lecture on "The Lesson of the Colorado Canyon" at seventeen different colleges and universities and also at the Grand Rapids Public Library and before the Chicago Geographic Society. During the year he made field studies of the Basin Ranges and of the San Luis Valley. His study of "The Lesser Antilles" with special reference to their coral reefs is in process of publication by the American Geographical Society and he nearly has completed a full report on the coral reef problem for publication by the same organization.

D. H. Davis has been appointed head of the newly created Department of Geography at the University of Minnesota. With the hope of producing results of significance to the community, the department now has under way a geographic field study of a Minnesota community. The Geography of the Kentucky Blue Grass, one of a series of regional studies he is carrying on for the Kentucky Geological Survey, is now in process of publication.

H. W. Fairbanks spent the first part of the year in a trip around and through South America with the purpose of gathering first hand information for a revision of a manuscript on South America. This work is to be the second volume of his "New Progressive Series of Geographies."

Oliver L. Fassig is preparing for publication an article on the Climate of Porto Rico.

H. A. Gleason is collaborating in an ecological survey of Porto Rico. This work is a continuation of the general scientific survey of the island and is supported jointly by the New York Botanical Garden and the Department of Agriculture of Porto Rico.

J. W. Goldthwait is studying several typical rural New Hampshire towns to determine the manner and extent to which their more remote portions have been abandoned since 1830. During the summer of 1925 he was occupied with field studies under the direction of the Geological Survey of Canada with the purpose of preparing a memoir on the Physiography of the St. Lawrence Lowland. He has in preparation a brief report on the brick clay deposits and products of New Hampshire.

J. Paul Goode is engaged in the preparation of a series of lantern slide maps as aids in the teaching of geography. These slides are issued in color and five series are in preparation. The first series consists of

18 slides of general maps, including the world on various projections, the continents, and the United States. All of these are without names, and are intended to be used as memory test maps in a study of place geography. The second series consists of 200 titles. These are regional maps, all on a physical base, tinted to contours and carrying political and cultural data. All of the first series and part of the second are now available. He has also a series of physical and political globes in preparation. Included are globes on the scale of 1 inch to 1,000 miles, of 1 inch to 500 miles, and of 1 inch to 300 miles.

Herbert E. Gregory continued his studies of Death Valley, California, and conducted explorations in western San Juan County, Utah. from March to September he was in the Hawaiian Islands fulfilling obligations as Director of the Bernice P. Bishop Museum and as chairman of the Committee of Pacific Investigations of the National Research Council. He taught his usual classe at Yale in the autumn.

Roland M. Harper has been working for the Florida Geological Survey, and had charge also of the state population census of 1925. During the fall he made an extensive tour of the eastern states and Canada. He is preparing a report on the natural resources and physical geography of South Florida, to be published in the annual report of the State Geological Survey.

A. J. Henry has been undertaking various research problems that bear upon the possibility of long range weather prediction. These include studies on the variations of atmospheric pressure in the northern hemisphere for the period from 1910-1917. He also is studying the relation of North Pacific pressure distribution to the weather of North America.

William H. Hobbs was in Copenhagen in September as official advisor for planning the scientific work of the Danish Expedition to the east coast of Greenland in 1926-27. During this same period Professor Hobbs, under the auspices of the University of Michigan, and with the support of several federal bureaus, will himself lead an expedition to the west coast of Greenland. He plans to establish a base near Holstensborg, and will give special attention to meteorological conditions. He reports a monograph entitled "The Glacial Cyclones, the Poles of the Atmospheric Circulation" as now in press.

Geo. D. Hubbard continues his work on "The Physiography of Ohio," a forthcoming bulletin of the Ohio Geological Survey. He

carried on field studies of the geology and physiography in the vicinity of Narrows, Va., in connection with a summer field class. He reports that courses in geography may now be elected to meet the general science requirement at Oberlin College.

Ellsworth Huntington recently has made a statistical study of the distribution of certain products and of the use of the land. He studied "the effect of the relief, soils and minerals by methods similar to those employed in the study of climate." Part of the results have been embodied in the revision of "Business Geography," to appear in 1926.

Beginning on January 1, 1926, Mark Jefferson is on sabbatical leave from the Michigan State Normal College. Recently he was elected Corresponding Member of the Swedish Anthropological and Geographical Society. He has in course of publication by the American Geographical Society a volume to be entitled "Peopling the Argentine Pampa" and has written for the *Geographical Review* an article on "Actual Temperatures in South America," and a review of Shantz and Zon's *Natural Vegetation in the Atlas of American Agriculture*. A new issue of his "Man in Europe" shortly is to appear and he is under contract for a similar volume on the United States.

W. L. G. Joerg has been appointed a member of the Division of Geology and Geography of the National Research Council, as representative of the American Geographical Society.

Douglas Johnson investigated a case of local land subsidence in the Goose Creek region of the Texas Gulf Coast for an oil company. As submerged lands belong to the state, Texas claimed title to the area. Since it was possible to show that the subsidence was due to the extraction of oil, gas, water and sand, settlement was made in favor of the oil company. In December he addressed the officers of the United States Army War College on the subject "The Military Geography of Northeastern United States." In the same month he appeared before the Colgate University chapter of Phi Beta Kappa. He has been awarded the Edouard Gaudy Medal of the Societe de Geographie Commercial de Paris, and has received the A. Cressy Morrison prize of the New York Academy of Sciences for his book, "The New England Acadian Shore Line."

Wellington D. Jones is working with D. S. Whittlesey on Volume II of "An Introduction to Economic Geography—Major Economic Activities as Related to the Natural Environment."

Arthur Keith has submitted the manuscript of his "Handbook of New England Geography" to the U. S. Geological Survey for publication.

J. B. Kincer has been promoted to the position of Chief of the Division of Agricultural Meteorology of the U. S. Weather Bureau

G. R. Mansfield is secretary of Section E of the American Association for the Advancement of Science and is chairman of the Committee on Tectonics in the Division of Geology and Geography of the National Research Council. He spent last summer in field work in the Paradise Valley and Ammon quadrangles, Idaho, and the autumn visiting various occurrences of non metals in Northwestern United States. He has in preparation a report on the phosphate resources of the United States, for the International Geological Congress, Madrid, 1926, and a report on the Geography and Geology of the Phosphate Deposits of the Portneuf quadrangle, Idaho. His professional paper on the Geography and Geology of Northwestern Idaho, and his Tectonic map of the United States are in course of publication by the U. S. G. S.

H. A. Marmer reports progress on his studies of "Tidal Datum Planes," of "The Tides at Tahiti," and of the "Relation of Currents to Wind."

F. E. Matthes during the summer of 1925 studied the physiography and glacial geology of the Kings River basin, in the Sierra Nevada of California, made special study of location of Sequoia groves in the Sierra Nevada with reference to the limits of glaciation, made a reconnaissance up San Jacinto Peak, southern California, in search of evidences of glaciation, and is preparing contour maps to serve as bases for a series of five large relief models showing the successive stages in the development of the Yosemite Valley from Miocene time to the present (for the new museum in Yosemite National Park). He has in course of publication professional papers on "The Yosemite Valley," and the "Physiography and Glacial Geology of the Upper San Joaquin Basin, California."

Robert Cushman Murphy spent the period from December, 1924, to March, 1925, in field work along the west coast of South America. In January, 1925, he was granted the honorary doctorate in science from the University of San Marcos, Lima, Peru (oldest university in the western hemisphere). His report on "Oceanic and Climatic Phe-

nomena Along the West Coast of South America in 1925" is now in print. He is at present engaged in research relating to oceanic ornithology, oceanography and climatic phenomena, and is continued in charge of the Whitney South Sea Expedition of the American Museum. Recently he was elected to membership in the American Geophysical Union.

G. E. Nichols is treasurer of the Botanical Society of America, and last summer was a member of the staff of the University of Michigan Biological Station. He is preparing a winter key to the woody plants of northeastern America.

A. E. Parkins was the 1925 president of the National Council of Geography Teachers.

R. S. Platt has under way a study of Mexican railway systems and their traffic.

William N. Rice is a member of the advisory committee organized after the Scopes trial.

John L. Rich is preparing a paper on the "Buried Pennsylvania Channels and Sand Bars of Eastern Kansas." He has been studying the petroleum geology of eastern Kansas, especially with reference to the channel and sand bar oil pools. His report on the "Glacial Geology of the Catskill Mountains" nears completion.

G. T. Rude has been promoted from Hydrographic and Geodetic Engineer, with relative rank of Lieutenant Commander to Hydrographic and Geodetic Engineer with the relative rank of Commander, U. S. Coast and Geodetic Survey.

R. H. Sargent during the past summer conducted exploratory work and made reconnaissance and topographic surveys in the interesting volcanic region on the southwestern part of the Alaskan peninsula. His work included the mapping of the mammoth Aniakehak crater which he discovered in 1922. This area with its craters, ash deposits, lava flows, and glacial activities afforded a fertile field for the study of volcanology.

C. O. Sauer has in press a study of "The Pennyroyal" for the Kentucky Geological Survey, and reports progress on studies of "The Site of San Francisco," and "The Coast Range of Lower California."

Ellen C. Semple is scheduled for a course of lectures on the "History of Geographic Theory" at Clark University, during the spring semester, 1926.

H. L. Shantz during the last field season studied the distribution of native vegetation in Utah, the Northern Great Plains, and the provinces of Alberta, Saskatchewan, and Manitoba. He gave a five weeks lecture course on plant geography at Clark University during the fall.

Howard E. Simpson as state water geologist of North Dakota is in charge of the survey of the ground water resources of the state and of the administration of the Artesian Water Conservation Fund. As a member of the State Park Commission he is interested in the development of state parks for the conservation of wild life, the preservation of historic sites, and for service as recreation centers. Twenty of these have been established already.

J. Russell Smith is on sabbatical leave. With his wife and two sons he sailed from San Francisco on July 15 for Hawaii. After a two weeks' stop there he proceeded to Japan, where he spent several weeks in the industrial and agricultural areas. After hurried trips through Korea and Manchuria, some time was given to the study of the agriculture of Shansi. He is at present in southeastern Asia. He will visit India and from Bagdad he hopes to make a journey into Persia and into the Caspian area.

Vilhjamur Stefansson reports that his "Hunters of the Great North," "The Friendly Arctic," and "My Life With the Eskimo" have now appeared in German through A. F. Brockhaus of Leipzig. Two of his books have been published in Sweden by Hugo Geber of Stockholm, and two are in course of printing in Czechoslovakia through the Cin-Verlag of Prague.

E. L. Stevenson presented "A Survey of the Development of Geographical Science from Its Earliest Beginnings," as the principal address at the opening session of the International Geographical Congress held in Cairo April last. He gave also during the Congress "The Geography of the New World as Interpreted by the Early Explorers and Map-Makers." His second address was repeated in Florence in June. King Fouad I of Egypt conferred upon him the honor of "Grand Officer of the Order of the Nile." During the year he received the degree of Litt. D. from Rutgers College.

Helen M. Strong recently was appointed as Geographic Expert in the Bureau of Foreign and Domestic Commerce and upon recommendation of Secretary Hoover has been appointed by President Coolidge to represent this bureau on the United States Geographic Board. She has under way studies on the essentials in the foreign trade of the United States and of the trade of the United States in agricultural products. She also is at work on a number of maps presenting the economic and geographic relations of the foreign trade of the United States.

David G. Thompson read a paper at the recent annual meeting of the Geological Society of America. He is continuing his studies on the quantities of ground water available from certain formations in New Jersey. He has gathered some interesting data on the fluctuations of the water level in wells 800 feet deep due to tides.

Frederick J. Turner has been given one of the Milton Fund awards by Harvard University for the purpose of completing a history of the United States for the period from 1830 to 1850. He has been elected to the first, and only, "Fellowship of the State Historical Society of Wisconsin." He lectured on "The Section in American History" during the six weeks of the National Summer School, at Logan, Utah. He also lectured on the same subject at Knox College, James Millikin University, University of Illinois, and University of Wisconsin. Four different books appearing in 1925 were dedicated to him.

Eugene Van Cleef is on leave from Ohio University and is enrolled as a fellow, at Clark University. He is preparing a manuscript on "The Republic Farthest North," which is a study of the response of Finnish life to its geographic environment. In the summer of 1926 he plans to return to Finland for further research.

T. W. Vaughan reports that on October 14, 1925, the name of the Scripps Institution for Biological Research was changed to the Scripps Institution of Oceanography. This Institution is the only one in the United States whose efforts primarily are devoted to the study of the ocean in a comprehensive way. On November 6 and 7 there was held at the Institution a conference on the Physical Oceanography and Marine Meteorology of the Northeast Pacific and the Climate of the Western Part of the United States. Mr. Vaughan states that the papers and discussions would have interested many members of the Association of American Geographers. Last June he was elected foreign correspondent of the Geological Society of London.

S. S. Visser taught at the University of Colorado last summer and is scheduled for the summer of 1926 to teach at Cornell University. He recently has completed the geographic supplement for the forthcoming one-volume Century Dictionary.

Robert De C. Ward has been chairman of the Board of Freshman Advisors of Harvard College since last May.

Lewis G. Westgate has been engaged on the preparation of a report on the Pioche (Nevada) region for the U. S. Geological Survey and of Delaware County (Ohio) for the Ohio Geological Survey.

R. H. Whitbeck spent the second semester of 1924-25 in five South American countries and his volume on the Economic Geography of South America is now in print.

Frank E. Williams again had charge of the work in geography at the Delaware County, Pennsylvania Teachers' Institute in October of 1925. In addition to his regular work at the University of Pennsylvania he is giving a course entitled "Resources and Industries" in the Department of Economics at Swarthmore College.

D. S. Whittlesey is working with Wellington D. Jones on the second volume of "An Introduction to Economic Geography." He spent the winter quarter of 1925 in Martinique and other West Indian islands. During the summer of 1926 he plans to make an intensive study of a portion of the upper Connecticut Valley with a small group of advanced students. It is hoped that the results will be embodied in a monograph of the regional geography of the area.

John Kirkland Wright is editing Alois Alisil's six-volume work on Arabia, to be published by the American Geographical Society.

Raphael Zon during 1925 was Editor-in-Chief of the *Journal of Forestry*, was promoted to a full professorship at the University of Minnesota, and was chairman of the Committee of Forestry, Division of Biology and Agriculture, National Research Council. He has under way studies of the effect of water level in swamps upon forest growth, as well as a study on forest leaf litter. He is preparing a manuscript on "Timber Growing and Logging Practice in the Lake States."

**PUBLICATIONS OF MEMBERS OF THE ASSOCIATION OF
AMERICAN GEOGRAPHERS IN 1925**

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